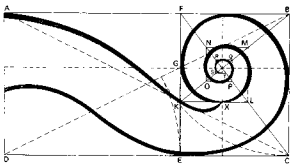

# Maker's Bench

## Understanding Changes Over Time in Your or Your Students' Instruments and Bows

by John Waddle

As a violin-maker, dealer, repairer and restorer, I regularly see instruments with problems due to various factors. One of the biggest factors is changes in humidity.

Bowed stringed instruments are under tension and stress, and because they are made of wood, are affected by changes in humidity. Bows made of wood (Pernambuco or Brasil wood) are also subject to changes caused by tension and changes in humidity.

Tuning pegs are usually made of ebony, rosewood, or boxwood. All woods will swell when the humidity goes up, and shrink when the humidity goes down. Sometimes pegs will swell in summer to the point that they become stuck and won't turn at all. In winter, they can shrink and lose their hold in the peg box, resulting in loose strings.

Wood tends to shrink more across the grain than with the grain, which means that pegs may shrink unevenly, which results in pegs that may have been round when shaped and fitted to the peg box, but have lost their original shape and now don't turn smoothly. Swelling pegs can also cause cracks in the peg box. It's best to have the pegs replaced when they become too worn, or are too out of round, but sometimes some peg compound will be enough to make them turn smoothly again.

Fingerboards are also still mostly made of wood (ebony), which will expand and shrink with humidity changes. Necks are usually maple, which will expand and shrink at a different rate from ebony, which sometimes results in the fingerboard letting go and falling off. Usually if the fingerboard has fallen off, it can just be glued back on.

Tops of violins, violas and cellos are usually made of spruce, which can expand quite a bit in summer, and shrink quite a bit in winter. This movement of the wood is usually not enough to cause problems, but will sometimes result in open seams between the top and the ribs, or cracks in the wood of the top. Spruce seems more prone to movement than maple (maple is what most backs are made of), but maple will also change. Open seams can be glued back together, and cracks can be repaired.

In some instruments, subtle changes in a combination of all the parts of the instrument will result in the neck angle going up or down. The player will notice that the string heights have changed. This is most noticeable in cellos and basses. This is why many bass players have adjusters installed in their bridges so they can adjust their own instruments at will. Cellists often have a summer bridge and a winter bridge. Some have one bridge with a collection of small shims to put under the feet to raise the string heights.

Wood is hydroscopic, and humidity changes can be enough to affect the weight of the instrument. I record the weight of all the instruments and bows in my shop, and I've noticed that if I weigh an instrument in the winter, it may weight more in the summer, or vice versa. This is true of bows as well. Bows will sometimes be heavier in summer and lighter in winter. The horsehair in the bows is hydroscopic; in summer, it takes on water and stretches out, and dries out in the winter and gets shorter. The water that is taken in or given off has enough weight to it that it can be measured.

In a climate with little to no change in humidity, many of these problems would not exist, but here in Minnesota, we have extremes of both temperature and humidity. Certainly using a humidifier in the room where the instrument is kept in the winter is a good idea. There are good humidifier options for cases now as well, and using them could reduce some of these problems. I have been an advocate of humidifiers for the inside of the instrument (dampits), but some people seem to disagree, citing examples of instruments that have been damaged by water dripping inside the instrument. I have only seen one instance of this. It was a bass dampit, which was being used to humidify a mandolin, and the owner of the mandolin had not been squeezing the excess water out of the dampit before putting it in the mandolin, so it had been dripping water. This was very unfortunate for the mandolin, but could have been easily prevented.

Humidity changes can also have an affect on sound. I have had some musicians tell me that their instruments sound better in the summer, and some tell me that their instruments sound better in the winter. This is understandable considering what is happening with the woods. Most of the time, the changes are not dramatic, so most musicians just live with what ever is happening and accept it, but some are more proactive and try to get their instruments adjusted to sound a certain way all the time. This works some of the time, but not all the time.

Often I am making longer sound-posts for instruments. This is not because the length of the sound-post changed (although there may be some compression), but because the thin and somewhat flexible top and back have eased into new shapes since the last sound-post was made for the instrument, and now the instrument needs more support from the sound-post.

For shops, it can be quite challenging to keep up with all the changes that occur. For instance we might be asked to re-hair a bow for somebody in February, when the air is the driest, and then have the bow come back in June or July with the hair too long because the hair stretched out, or we might be asked to re-hair a bow in August, only to have it come back in December with the hair too short because the hair shrank. Or we might set up and instrument in August, when the humidity is at the highest point, and then find in January that the neck angle is different because the air is so much drier, resulting in a difference in what many players call "the action" (the height of the strings over the fingerboard).

Some instruments and some bows seem to be less susceptible to these changes than others, but all will change over time. Understanding why the changes occur and what to do when they happen

Originally published in MNSOTA's *String Notes* — Winter 2015–2016 (Vol. 18, No. 2)

will make all of your lives as musicians and teachers easier and more enjoyable.

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**Originally published in MNSOTA's *String Notes* — Winter 2015–2016 (Vol. 18, No. 2)**